Transform2040

Metropolitan Transportation Plan

Bloomington/Monroe County MPO

Adopted by the
MPO Policy Committee:
TBD, 2017

Introduction

Transportation is a common thread in the quality of life of the residents of any community. People must move safely and efficiently between their homes, workplaces, shopping opportunities, and recreational activities. For each trip that a person makes, there are options. What mode of travel will be used? Which route will best connect the trip origin with its destination? What are the costs and benefits of the decisions made with regard to each trip?

Transform 2040 seeks to quantify the answers to those questions over a 20 year time horizon. The Plan serves primarily as a means to predict future transportation needs and to illustrate a plan of action to meet those needs. Specifically, it provides a menu of transportation projects to be implemented over the next 20 years that may alleviate projected congestion points, safety hazards, and connectivity limitations.

This document has been designed specifically to fulfill Federal and State transportation planning requirements, and, in doing so, to ensure that the Bloomington/Monroe County Metropolitan Planning Organization maintains its eligibility for Federal transportation funding. The Plan study area includes all of Monroe County to ensure that all communities are represented and that system-wide solutions to transportation issues can be created in a cooperative and coordinated process. In addition, the Plan strives to achieve a multi-modal transportation perspective, including provisions to improve facilities for bicycling, walking, and public transit.

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Acknowledgments

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2 Guiding Principles

What is *Transform2040*?

The Metropolitan Transportation Plan (MTP) for the Bloomington Monroe County Metropolitan Planning Organization, *Transform2040,* sets the course for regional transportation investment in the Bloomington Urbanized Area for the next 25 years. It provides a framework for transportation decisionmaking and project selection that can be used in cooperation by the MPO partners to select and implement the right projects for the future of the region.

Transportation in the Bloomington Urbanized Area has changed significantly within the last ten years. The adoption of the BMCMPO Complete Streets Policy has impacted the selection and design of Federally funded local projects, ensuring that they are welcoming and safe for all modes of travel. The construction of the I-69 highway project, while still in progress, promises to profoundly alter local travel patterns and regional access to key resources. Steady growth in transit ridership and recent national declines in overall driving volumes portend exciting opportunities for the future.

Transform2040 will help the region respond to these challenges and opportunities. The vision, goals, and objectives provided in this chapter will guide MPO decisionmakers as they work to build the best possible transportation system for local users. Ultimately, all policy and investment decisions made by the MPO should be consistent with the vision, goals, and objectives set forth in the Plan.

Guiding Principles

Vision

We will build a transportation system that ensures the safe, efficient movement of people, whether by motor vehicle, transit, bicycle or walking; that is directed by relevant locally adopted land use and transportation plans; that is compatible with citizen desires; and that ultimately links our communities to each other, our region, our state, and our nation.

Goals

Mobility & Accessibility

Improve the movement of people through the transportation system as a means to create modal and social equity within the transportation system community

- Select transportation projects that do not induce sprawl development and that are sensitive to community character
- Encourage development patterns that are walkable, bikeable, and readily served by public transit
- Encourage infill development to most effectively utilize existing utilities and infrastructure
- Enhance the efficient movement of freight through maintenance, operational and capital investment decisions
- Annually allocate 20% of STP, or its equivalent in future transportation bills, to fund independent non-motorized projects that are not part of a larger roadway project
- Use local Americans with Disabilities Act (ADA) Transition Plans to identify deficiencies and implement projects that ensure promote proper integration of ADA components into the transportation system

Transit

Provide the community with efficient, affordable, frequent and reliable transit services

- Pursue all possible funding opportunities to increase public transit capital and operating investment to and expand, enhance, and increase the use of transit services
- Prioritize projects that will create or improve direct access to transit services
- Use the BMCMPO Coordinated Human Services Transportation Plan to identify and remove gaps in transit services to elderly, disabled and low-income citizens in the region
- Encourage transit projects that increase "choice-riders" who choose to take transit even though they may have other travel options.
- Continue to fund transit projects that maintain or upgrade current facilities
- Encourage the expansion of both geographic coverage and hourly services offered by transit
- Encourage the use of advanced technologies such as hybrid buses in regular transit services and operations

Community

Ensure that transportation projects maximize the community's quality of life and are compatible with local land use plans and policies

- Involve the public in transportation project selection, scoping, and implementation
- Incorporate context sensitive solutions and best practices into all project designs as set forth in alternative transportation plans, comprehensive plans, subdivision control ordinances and site design review processes
- Pursue all possible funding opportunities to increase trail use and investment

- Plan, design, develop, construct and maintain transportation facilities to minimize adverse impacts on environmentally sensitive areas, public parks and recreation areas, historic structures and neighborhoods
- Incorporate aesthetic elements such as streetscape features into transportation projects such that they are compatible with the abutting area
- Implement public outreach programs that create awareness of the impact that travel mode choices have on the transportation system, the environment, and the community

Safety

Improve the safety of the transportation system for all modes and all users

- Fund non-traditional, non-capacity adding projects that encourage and educate the public about safe driving, biking, walking, and using transit
- Encourage safety and civility among roadway users of all modes
- Analyze the causes of traffic safety hazards and reduce those hazards in a comprehensive, systematic and sustainable way
- Annually evaluate the top 10 crash locations by crash rate and crash severity and implement quick, low-cost improvements while also seeking funding for more comprehensive changes if necessary

Preservation

Directly focus on maintaining existing transportation facilities before building new ones

- Adopt a "fix-it-first" mentality that directs funding and project selection to prioritize maintenance and renewal of existing transportation facilities
- Support projects that maximize the use of existing infrastructure through systematic, systemic and operational best practices
- Evaluate proposed project alternatives that maximize existing transportation facilities for all modes including freight
- Maintain and improve existing infrastructure through projects such as surface treatment, bridge repairs, improved striping paint, sign replacements and drainage improvements
- Create a Transportation Improvement Program that effectively directs spending in compliance with this Metropolitan Transportation Plan

4 Financial Forecast

Introduction

Financial resources define the feasibility, timing, and scope of transportation project implementation. This chapter defines reasonable financial forecasts that support the recommended multi-modal transportation needs plan for the Bloomington/Monroe County urbanized area. The resulting fiscally constrained plan of projects is a requirement first set forth in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. Successive Federal transportation legislation (TEA-21, SAFETEA-LU, MAP-21 and FAST) continued this requirement and permitted the inclusion of "illustrative" transportation projects for potential implementation if additional funding were to become available during the established twenty (20) year plan period.

Financial resources for federal, state, and local highway transportation projects are typically set aside for three categorical areas:

- Safety and Security - represent the highest multi-modal transportation system priority by protecting people, system users, and infrastructure investments.
- Capacity Preservation - protect existing capital investments which include operation and maintenance and reconstruction (including pavement resurfacing, bridge rehabilitation transit operations, and bicycle/pedestrian facilities) of existing transportation facilities and services and
- Capacity Expansion - major new transportation capital investments and include new roadways and interchanges, additional travel lanes, new transit facilities, and new bicycle/pedestrian facilities such as trails.

Federal Resources

Federal Programs

Current federal funding for highway, transit and railroad facilities is governed by the Fixing America's Surface Transportation (FAST) Act (Pub. L. No. 114-94). The FAST Act authorizes $305 billion over fiscal years 2016 through 2020 and maintains a focus on safety, keeps intact the established structure of the various highway-related programs, continues to streamline project delivery, and provides a dedicated source of federal dollars for freight projects. Major funding programs administered by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) include the:

- **National Highway System (NHS)** for the roughly 163,000 miles of the federally designed National Highway System that includes the Interstate Highway System (about 46,000 miles) and other freeways, expressways and principal arterials of national significance.
- **Interstate Maintenance (IM)** for Interstate Highway System resurfacing, rehabilitation and reconstruction.
- **Surface Transportation Program (STP)** for state and local roadways functionally classified as major collectors and arterials.
- **Highway Bridge Replacement and Rehabilitation Program (HBR)** for state and local bridges.
- **Congestion Mitigation and Air Quality Improvement Program (CMAQ)** for air quality non-attainment areas.
- **Federal Transit Program Formula Grants and Capital Investment Grants.**

Federal Funding Projections

Surface Transportation Program (STP)

Surface Transportation Program (STP) funds represent the primary source of federal support for improvements to urbanized area roadways. Urbanized areas with a population of 200,000 or more persons (referred to as Group I areas) have a dedicated funding allocation stipulated by federal statute. Indiana urbanized areas, such as Bloomington, with a population of 50,000 to less than 200,000 persons (referred to as Group II areas) receive funding allocations based on a proportion of statewide population.

Under a sharing agreement for surface transportation programs, the Indiana Department of Transportation (INDOT) retains 75% of the federal funds received by the State of Indiana. The remaining 25% federal fund balances are made available to local jurisdictions, including Metropolitan Planning Organizations.

The Federal STP fund allocation for the Bloomington urban area in fiscal year 2018 was approximately $2.750 million. A conservative, constant and real dollar growth rate of 2.0% has been used to forecast STP funds available between fiscal years 2018 and 2040. As shown below, the Bloomington urban area is likely to receive a total of $79,347,485 in STP funds between fiscal years 2018 and 2040 for locally initiated capital roadway system improvements.

Fiscal Years 2018 through 2027 =	$30,133,189
Fiscal Years 2028 through 2040 =	$49,214,296
Total	***$79,347,485***

Highway Safety Improvement Program (HSIP)

The Highway Safety Improvement Program (HSIP) provides federal funding for eligible safety improvement projects on local roadways. The Bloomington urbanized area received an annual allocation of $470,684 for fiscal year 2018. Using the same 2.0% annual growth rate, the following HSIP resources are predicted for Fiscal Year 2018 through Fiscal Year 2040.

Fiscal Years 2018 through 2027 =	$5,153,858
Fiscal Years 2028 through 2040 =	$8,423,004
Total	***$13,576,862***

Transportation Alternatives Program (TAP)

The Transportation Alternatives Program (TAP) provides federal funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation, and enhanced mobility. The Bloomington urbanized area received an annual allocation of $155,801 for fiscal year 2018. Using the same 2.0% annual growth rate, the following TAP resources are predicted for Fiscal Year 2018 through Fiscal Year 2040.

Fiscal Years 2018 through 2027 =	$1,705,977
Fiscal Years 2028 through 2040 =	$2,788,096
Total	***$4,494,074***

State of Indiana Investments

The Indiana Department of Transportation has one committed major capital project identified for construction in Bloomington and Monroe County between Fiscal Year 2018 and Fiscal Year 2040:

- I-69 Section 5 - the reconstruction of 21 miles of State Road 37 in Monroe and Morgan Counties from That Road to near vicinity of State Road 39. Approximately 16.5 miles of this construction is in Monroe County. The current estimated remaining construction cost of this project is approximately $73,000,000 in the MPO planning area. As of July 31, 2017, INDOT assumed responsibility for project construction which is currently scheduled for an August 2018 substantial completion date.

Indiana's 2013-2035 Future Transportation Needs Report does not identify any further major capital projects to be undertaken within Bloomington and Monroe County during this time period. Instead, the majority of investment is anticipated to focus on system preservation and safety enhancements to existing state roads in the MPO area. As these improvements will be undertaken on an as-needed basis, no firm estimate of future investments in such projects is currently available.

Federal Transit Program Formula Grants and Capital Investment Grants and State Assistance

Federal transit program formula grants and capital investment grants and state assistance are critical to the success of Bloomington Transit and its provision of service to 3.50 million annual customers.

The Federal transit formula operating and capital investment grants for Bloomington Transit totaled approximately $2.17 million in Fiscal Year 2017. A conservative, constant real dollar growth rate of 2.0% has been used to forecast these funds available between 2018 and 2040. As shown below, Bloomington Transit is likely to receive a total of $63,857,056 in formula grants and capital investment grants for Fiscal Year 2018 through Fiscal Year 2040.

Fiscal Years 2018 through 2027 =	$24,240,521
Fiscal Years 2028 through 2040 =	$39,616,535
Total	***$63,857,056***

State transit program assistance to Bloomington Transit totaled approximately $2.51 million in Fiscal Year 2017. A conservative, constant real dollar growth rate of 2.0% has been used to forecast these funds available between 2018 and 2040. As shown below, Bloomington Transit is therefore likely to receive a total of $73,899,433 in formula grants and capital investment grants for Fiscal Year 2018 through Fiscal Year 2040.

Fiscal Years 2018 through 2027 =	$28,052,668
Fiscal Years 2028 through 2040 =	$45,846,765
Total	***$73,899,433***

Local Resources

Primary resources for locally initiated transportation projects include Motor Vehicle Highway Account (MVHA) fund receipts, Local Road and Street Funds (LRS), the Wheel Tax, the Cumulative Bridge Fund, Cumulative Capital Development Funds, alternative transportation funds and, in certain instances, Tax Increment Financing (TIF) District funds.

Motor Vehicle Highway Account (MVHA) & Wheel Tax

MVHA receipts for Monroe County and the City of Bloomington typically exhibit an annual variability, but they are expected to stabilize in future years. MVHA funds must be used for the construction or reconstruction and maintenance of streets and alleys. These funds represent the primary operating and maintenance expenditures for Monroe County and Bloomington between 2018 and 2040. The forecast assumption for the 2040 MTP is that MVHA receipts will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for basic operations and maintenance.

Wheel Tax funds for Monroe County and Bloomington are used for resurfacing and minor roadway rehabilitation projects. The forecast assumption for the 2040 MTP is that Wheel Tax receipts will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes prescribed by the Indiana General Assembly.

Given MVHA and Wheel Tax receipts and under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$108,583,414
Fiscal Years 2028 through 2040 =	$177,458,996
Total	***$286,042,410***

Local Road and Street (LRS) Funds

Local Road and Street account (LRS) funds, including accelerated allocations, are available for capital investment; however, a portion of the funds must be set aside for preservation projects such as resurfacing, intersection/signalization, and safety improvements. Based on past and present budgets, approximately 80% of the Monroe County funds and approximately 50% of the City of Bloomington funds may be used for major capital investments. These funds represent the primary expenditures that will be used by Monroe County and Bloomington for engineering, land acquisition, construction, resurfacing, restoration, and rehabilitation of roadway facilities. The forecast assumption for the 2040 MTP is that LRS receipts will remain at a constant real dollar growth rates of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes prescribed by the Indiana General Assembly.

Given LRS receipts and under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$14,822,867
Fiscal Years 2028 through 2040 =	$24,225,165
Total	***$39,048,032***

Cumulative Bridge Funds

The Monroe County Cumulative Bridge Fund will continue to be dedicated to bridge preservation for the cost of construction, maintenance, and repair of bridges, approaches, grade separations and county-wide bridge inspections. The forecast assumption for the 2040 MTP is that the Cumulative Bridge Fund will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes prescribed by the Indiana General Assembly.

Given Cumulative Bridge receipts and under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$16,282,453
Fiscal Years 2028 through 2040 =	$26,610,582
Total	***$42,893,035***

Cumulative Capital Development Funds

The Monroe County and City of Bloomington Cumulative Capital Development Funds may be used for major roadway capital investments. The forecast assumption for the 2040 Metropolitan Transportation Plan is that the Cumulative Capital Development Fund will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes prescribed by the Indiana General Assembly.

Given Cumulative Capital Development Fund receipts for Monroe County and the City of Bloomington under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$46,554,228
Fiscal Years 2028 through 2040 =	$76,084,055
Total	***$122,638,283***

Tax Increment Financing (TIF) Funds

Tax Increment Financing (TIF) District revenue receipts are occasionally used by Monroe County and the City of Bloomington for capital infrastructure investments including roadway and drainage improvements. Forecasts for these districts are inexact given their direct link to project development, property values, and sunset provisions.

Given current receipts and constant rate trend growth, estimates for the Monroe County Fullerton Pike TIF, the SR46 TIF, and the Westside TIF, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$26,024,960
Fiscal Years 2028 through 2040 =	$42,532,875
Total	***$68,557,835***

Alternative Transportation Funds

The City of Bloomington established Alternative Transportation funding exclusively for pedestrian and bicycle infrastructure maintenance, preservation, and facility expansions more than a decade ago. Funds are allocated through annual municipal budget approvals by the Common Council. The forecast assumption for the 2040 Metropolitan Transportation Plan is that the Alternative Transportation fund allocations will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes prescribed by the City of Bloomington.

Given Alternative Transportation Fund allocations from 2012 through 2017 for the City of Bloomington under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$8,190,645
Fiscal Years 2028 through 2040 =	$13,386,061
Total	***$21,576,706***

Public Transportation Locally Derived Income

Federal transit program formula grants and capital investment grants help to support Bloomington Transit's service. Bloomington Transit is also supported by locally derived income (LDI) consisting of fare revenue, contract/other revenue, and local assistance.

The forecast assumption for the 2040 Metropolitan Transportation Plan is that locally derived income will remain at a constant real dollar growth rate of 2.0% until the Year 2040 and that these funds will continue to be used for the purposes currently prescribed by the needs of Bloomington Transit.

Given locally derived income revenues from 2012 through 2017 for the City of Bloomington under the assumptions outlined above, the following fiscal period forecasts can be reached:

Fiscal Years 2018 through 2027 =	$30,244,130
Fiscal Years 2028 through 2040 =	$49,428,294
Total	***$79,672,424***

Conclusion

The Bloomington/Monroe County urbanized area is forecast to receive approximately $79.3 million in Federal Surface Transportation Program (STP), $13.6 million in Highway Safety Improvement Program (HSIP), and $4.5 million in Transportation Alternatives Program (TAP) funds through Fiscal Year 2040 for transportation infrastructure investments.

The sum total of revenue sources from Monroe County and the City of Bloomington Motor Vehicle Highway Account, Wheel Tax, Local Road and Street, Cumulative Bridge Funds, Cumulative Capital Development, Tax Increment Financing, and Alternative Transportation Funds suggest that, given forecast assumptions, the BMCMPO planning area will have over $564 million in local funds available for safety, maintenance, preservation, and added multi-modal transportation system capacity activities for Fiscal Years 2018 through 2040.

The sum total of revenue sources for Bloomington Transit under formula grants, capital investment grants, and locally derived income suggest that, given forecast assumptions, the BMCMPO planning area will have over $210.6 million available for transit service activities for Fiscal Years 2018 through 2040.

A Appendix

Transportation Planning Requirements

Introduction

This Plan has been prepared to comply with the Federal Fixing America's Surface Transportation (FAST) Act and its predecessors. MPOs are required to have a continuous, cooperative and comprehensive planning processes that implement projects, strategies and services that will address the ten core planning factors. Those factors, along with an explanation of how *Transform2040* addresses them, are provided in this Appendix.

Planning Factors

Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity and efficiency

This Plan supports and builds upon locally adopted land use and development plans, helping to implement the local economic development goals of partner communities. *Transform2040* seeks to provide an efficient network where travel time reliability and on-time delivery services are maintained if not enhanced and productivity is strengthened by improved network circulation. One objective this Plan incorporates is connectivity and ease of movement by persons and goods in and through the area. This is achieved by investments across modes to ensure that multiple travel options are available and bringing balance to the transportation system.

Increase the safety of the transportation system for motorized and nonmotorized users.

Investments in safety are a high priority for *Transform2040*. This is accomplished in the following ways:

- The Plan advocates for system preservation rather than expansion, limiting the addition of lane miles where user conflicts could occur.
- The Plan supports increased investment in bicycle, pedestrian, and transit modes, providing opportunities for safer and more efficient travel by users of those modes.
- The projects contained in the Plan reduce congestion by providing alternative routes to satisfy user needs. With reduced congestion, conflicts are reduced and safety is enhanced.
- The BMCMPO Complete Street Policy compels LPAs to consider the needs of all users within a corridor when designing a project.

Increase the security of the transportation system for motorized, nonmotorized and transit users.

Transform2040 enhances the security of all transportation users in several ways. Increasing roadway connectivity provides redundancy in the system, allowing for multiple routes of ingress and egress and flexibility in planning evacuation routes in emergency situations. Monroe County Emergency Managmenet Adminstration (EMA) is the lead county agency for security issues and BMCMPO will play a supporting role providing them with assistance as needed.

Bloomington Transit has several security strategies in operation. Access control, surveillance and monitoring on bus as well as office and maintenance facilities are currently employed strategies. Operations include Computer Aided Dispatching and Automatic Vehicle Locator technology.

Increase the accessibility and mobility options available to people and freight.

Transform2040 strengthens and creates accessibility on two distinct levels. One focuses on improving the continuity of the road network. The other provides additional connections and improvements between modes of travel. All citizens, travelers and businesses benefit from this dual approach. This Plan reduces travel and delivery time by increasing accessibility through the completion of key new connections and the enhancment of existing corridors. Access to the new I-69 highway greatly increases statewide and national connectivity for local user.

Transform2040 increases bicycle and pedestrian mobility, as well as the safety of transit riders because all proposed road improvements are required to include provisions for these modes. When sidewalks and trails are available it is safer for transit users as well as provides more options for bicyclists and pedestrians.

Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.

Transform2040 clearly supports these goals by recommending the implementation of transportation projects that are consistent with adopted local land use plans. It is clear from analysis of the MPO region that local land use decisions have the greatest impact on transportation system performance. It is thus paramount that transportation investments made by the MPO are supportive of best practices in land use planning, including focusing development density in existing urban centers rather than encouraging sprawl development.

The Plan's focus on system preservation over expansion as well as emphasis on investment in non-motorized transportation facilities will certainly support the protection and enhancement of the environment. The Plan is also strongly supportive of further investment in public transit services, which will reduce single-occupant vehicle usage on the roadway network. These types of investments are especially important in offsetting the potential environmental impacts of the new I-69 highway corridor throught the MPO region.

Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.

This Plan sets forth a program of goals and projects that support the integration and connectivity of the transportation system. Roadway network improvements focus on enhancing the existing system while providing key new connections, particularly in response to I-69 highway impacts. Investments across modes will expand travel options for community residents.

Transform2040 builds upon the multi-modal plans and programs of previous plans. Transit use, bicycling, and walking play an increased role in the region and this plan makes specific recommendations for both bicycling and walking. BMCMPO works closely with Bloomington Transit to assist it in serving the community, because multi-modal travel promotes energy conservation and improves the quality of life.

Promote efficient system management and operation

The local partners of the MPO have management systems for pavement and traffic, bridge, and transit programs. These allow the jurisdictions to monitor system performance and needs, identify deficiencies, and then target specific projects to address needs. Pavement and traffic management systems allow them to utilize existing transportation facilities more efficiently (e.g. pavement maintenance, signal timing and coordination, sign replacement, pavement marking, and intersection improvements). Additionally Monroe County has a bridge inventory and management system. All jurisdictions are now updating roadway management systems to address Americans with Disabilities Act needs. All use their systems to document and establish priorities.

Bloomington Transit has practiced system management practices that promote safety, mobility and more efficient use of their existing transportation infrastructure. Consistent ridership increases are evidence that their aggressive programs of information management, fleet maintenance and acquisition, marketing, schedule adherence and strategic planning contribute to a system that successfully provides an alternative to the automobile.

The concept of corridor re-use and joint corridor use also make existing transportation facilities more effective. There are very few new corridors or major new construction projects recommended in the *Transform2040*. Most improvements utilize existing corridors or are extensions of existing facilities that provide greater connectivity to the transportation system. The planned inclusion of bicycle and pedestrian facilities, as well as transit accommodations where appropriate, within roadway projects will support shared use of corridors in the region.

Emphasize the preservation of the existing transportation system.

One of the key tenets of the Vision and Goals of *Transform2040* (Chapter 2: Guiding Principles) is the concept of system preservation. The Plan advocates adopting a "fix it first" mentality to ensure that investments in maintaining and improving the existing system are prioritized over those that would expand exsting roads or create new corridors where none exist.

Most proposed road improvements in the community are on existing, not new, corridors. Several roads will be reconstructed within existing corridors. Most of the recommended projects follow changes in land use and are for roads that were originally built as rural cross sections that now need to be updated to an urban cross section with sidewalks and bicycle facilities.

Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.

The Monroe County Emergency Management Agency (EMA) is this community's lead for crisis and disaster response. The MPOs local partners are represented on the Local Emergency Planning Committee. The EMA also works closely with Community Organizations Active in Disaster (COAD) for Monroe County as well as District 8 Indiana EMA, a multi-county regional EMA. Additionally, local asset management systems allow for the timely assessment, speedy repair and recovery from unexpected infrastructure damage.

Bloomington and Monroe County have long operated stormwater utilities that manage such infrastructure and provide for its maintenance and enhancement over time. All new or upgraded roadway corridors include stormwater runoff control as a significant priority in their design.

Enhance travel and tourism.

Bloomington and Monroe County have long been recognized as destinations for outdoor recreation, in particular for bicycling. Past and future investments in bicycle infrastructure supported by the MPO will continue to enhance that reputation and draw in visitors for important bicycling events like the Little 500 race and the Hilly Hundred Bike ride. In addition, local investments to provide connectivity with the new I-69 corridor will improve the ability of local residents to access statewide and national destinations and allow greater access for visitors coming from outside the region.

B Appendix

Performance Measures

Introduction

The FAST Act and MAP-21 have new requirements for performance management in transportation planning. National performance goals have been established in 7 key areas and states and MPO are to establish performance targets in support of the national goals. The national performance goals for Federal Highway programs are:

- **Safety** – to achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Infrastructure condition** – To maintain the highway infrastructure asset system in a state of good repair.
- **Congestion reduction** – To achieve a significant reduction in congestion on the National Highway System (NHS).
- **System reliability** – To improve the efficiency of the surface transportation system.
- **Freight movement and economic vitality** – To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- **Environmental sustainability** – To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- **Reduced project delivery delays** – To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

Performance Measures

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) issued new transportation planning rules on the statewide and metropolitan transportation planning processes to reflect the use of a performance based approach to decision-making in support of the national goals. These processes must document in writing how the Metropolitan Planning Organizations (MPOs), Indiana Department of Transportation (INDOT) and providers of public transportation shall jointly agree to cooperatively develop and share information related to transportation performance data, the selection of performance targets, the reporting of performance to be used in tracking progress toward attainment of critical outcomes for the region of the MPO (see 23 CFR 450.306(d)) and the collection of data for the INDOT asset management plan for the National Highway System specified in in 23 CFR 450.314(h).

FTA has performance measures for Transit Asset Management, and final regulations are published and currently in effect. FHWA has performance measures and final regulations published for Safety, Bridge and Pavement Conditions, Congestion Reduction and System Reliability, but only the Safety Performance Measure regulation is in effect at this time.

INDOT along with the MPOs and FHWA will continue to collaborate to identify Performance Targets for each Performance Measure. Once Performance Targets are established, the Transportation Improvement Program (TIP) and Statewide Transportation Improvement Program (STIP) will be modified to reflect this information.

For FHWA and FTA to approve any TIP amendments after May 27, 2018, the INDOT, MPOs and Public Transit Operators must reflect this information and describe how projects in the TIP/STIP, to the maximum extent practicable, achieve the Federally required performance targets identified in the Statewide and Metropolitan Transportation Plans, linking investment priorities to these performance targets.

Safety

The INDOT, the MPOs, FHWA, and Indiana Criminal Justice Institute (ICJI) are actively discussing and collaborating on the Safety Performance Measures and Safety Performance Targets. INDOT will submit their Safety Performance Measures by August 31, 2017, and the MPOs will have until February 27, 2018 to follow INDOT's submission to either support the INDOT Safety Targets or set independent targets. The Highway Safety Improvement Program (HSIP) is a primary source of federal funds for qualifying safety improvement projects. HSIP along with other funding sources are used to implement safety improvements with the purpose to reduce roadway crashes, and a corresponding reduction in fatalities and serious injuries on all public roads. The five specific safety performance measures are:

- Number of fatalities;
- Rate of fatalities;
- Number of serious injuries;
- Rate of serious injuries; and
- Number of non-motorized fatalities and non-motorized serious injuries

If FHWA makes effective the rules they have published for assessing pavement and bridge condition for the National Highway Performance Program and performance of the National Highway System (NHS), freight movement on the Interstate System and Congestion Mitigation and Air Quality (CMAQ) improvement program, INDOT and the MPOs will have to establish performance targets for these measures, too.

Pavement and Bridge

The pavement and bridge condition performance measures are applicable to the Interstate and non-Interstate Highways that comprise the National Highway System (NHS). The NHS includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility. The measures are focused on the condition of pavement and bridges, including ramps utilized to access the system. There are four measures to assess pavement condition and two measures for assessing bridge condition.

Pavement Performance Measures

- Percentage of pavements of the Interstate System in Good condition
- Percentage of pavements of the Interstate System in Poor condition
- Percentage of pavements of the non-Interstate NHS in Good condition
- Percentage of pavements of the non-interstate NHS in Poor condition

Bridge Performance Measures

- Percentage of NHS bridges classified as in Good condition
- Percentage of NHS bridges classified as in Poor condition

The INDOT, the MPO and FHWA will collectively develop targets for the pavement and bridge performance measures. The National Highway Performance Program is a core Federal-aid highway program that provides financial support to improve the condition and performance of the NHS, and the construction of new NHS facilities. INDOT utilizes these funds for maintenance activities on the NHS.

System Performance

The system performance measures are also applicable to the Interstate and non-Interstate NHS. These performance measures assess system reliability and freight movement, and establish several measures for on-road mobile source emissions consistent with the Congestion Mitigation and Air Quality (CMAQ) Program. There are two measures for assessing reliability, one measure to assess freight movement, and three measures for the CMAQ program.

Reliability Performance Measures

- Percent of the Person-Miles Traveled on the Interstate System That Are Reliable
- Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable

Freight Movement Performance Measure

- Truck Travel Time Reliability (TTTR) Index

CMAQ Measures

- Annual Hours of Peak-Hour Excessive Delay Per Capita Percent of Non-SOV Travel
- Percent Change in Tailpipe CO2 Emissions on the NHS Compared to the Calendar Year 2017 Level
- Total Emissions Reductions

Transit Performance Measures

The Transit Asset Management Final Rule requires transit providers to set performance targets for state of good repair by January 1, 2017. The Federal Transit Administration has since extended that deadline to January 1, 2018. The Planning Rule requires each MPO to establish targets not later than 180 days after the date on which the relevant provider of public transportation establishes its performance targets. BMCMPO will adopt the targets established by Bloomington Transit. Targes will be established in the following categories:

Rolling Stock

- Percent of revenue vehicles that have met or exceeded their useful life benchmark.

Equipment

- Percent of service vehicles that have met or exceeded their useful life benchmark.

Facility

- Percent of facilities rated below 3 on the condition scale.

C Appendix

Methodology

Introduction

This plan was developed by BMCMPO staff with assistance from a consultant. Staff focused on the public input process and plan development while the consultant developed a new travel demand model (TDM) for the MPO. Specific details about the TDM are set forth in Appendix C. The following appendix details the plan development process that was used, with particular focus on public input opportunities.

Transform 2040 Public Workshop - map exercise on needs/issues to help identify specifically where improvements should be made.

Public Outreach Process

Public and stakeholder outreach has been continuous throughout the development of Transform 2040. Through a variety of stakeholder interviews, the creation of a task force, public workshops, public open houses and interagency consultation and coordination, the BMCMPO has received ample input and thus direction regarding the vision, travel demand model scenarios, public outreach activities, strategies and more.

Public notices, press releases, and contact lists were used to notify the public on all of the outreach opportunities listed below. All locations and meetings were accessible and open to the public. The methods for gathering public input has been summarized below and feedback has been used to help further shape and refine the MTP throughout the development and approval process.

MTP Task Force (2010 - 2014)

The Metropolitan Transportation Plan Task Force was created by the Bloomington/Monroe County Metropolitan Planning Organization (BMCMPO) to first help review best practices of other similar sized MPOs, evaluate the current 2030 MTP, and help develop a Request for Proposals (RFP) and a scope of work for to update the 2030 MTP. The RFP process allowed the BMCMPO to select and hire a professional consultant to assist staff with the planning and technical modeling efforts necessary. Its membership was comprised of members from the MPO Policy, Citizen's Advisory, and Technical Advisory Committees. Once a consultant was selected the Task Force continued to provide review and guidance regarding preliminary public outreach efforts, data collection, scenarios, and general information needed to facilitate staff with the update of MTP.

Key Stakeholder Interviews (2013)

BMCMPO staff conducted with a series of small group stakeholder interviews to initiate preliminary issues and opportunities. Several group sessions with BMCMPO staff were held to ensure that key transportation stakeholders had an opportunity to express their needs and desires for the future transportation system. Participants were asked to provide insight on the strengths and weaknesses of transportation in the community today and how they thought it could be improved upon in the future. Many businesses, organizations, and agencies were invited to participate in these meetings. Hoosier Energy, Bloomington Hospital, IU Campus Bus, IU Student Representative, Monroe County Coalition for Access and Mobility, Area 10 Agency on Aging, Monroe County Community School Corpora-tion, Indian Creek Fire Department, Ellettsville Fire Department, Van Buren Fire Department, and the Bloomington Police Department attended. Their feedback is summarized below by topic area.

Local Businesses/Employers and Transit:

- Attendees felt that the new bypass north of Bloomington, as well as, the various roundabouts has improved transportation.
- Weaknesses that were mentioned include 10th street railroad underpass as it relates to transit, congestion on Tapp Road during peak hour, specifically at the Tapp & Rockport Road intersection.
- There is an interest to have transit services on Tapp Road to serve Hoosier Energy and the new hospital location at North Park.
- Pedestrians crossing Rogers at 1st Street is challenging with fast moving traffic. Attendees showed interest in a wider road from State Route 37 to the hospital on 2nd Street.
- Attendees felt that more signals and roundabouts should replace four-way stops and that one-way streets could negatively impact emergency access to the hospital.
- One-way streets and mid-block crossings can have a negative impact on transit services.
- A Woodlawn connection could improve route efficiency and it was suggested to hire a cadet at intersections to direct traffic during peak hours.

Environmental Justice and Accessibility

- Participants felt that the strengths of transportation included a strong transit system. BT Access covers a large area and transit access is close to residential areas.

- Participants felt that weaknesses included disconnected sidewalks, and a lack of transit services beyond the city limits that could serve Monroe Hospital and Ivy Tech.
- Participants felt that roundabouts can be challenging for the visually impaired and suggested putting a pedestrian signal at every roundabout.
- Visually disabled could be better served with the installation of more audible signals and the use of ramped curb cuts as they are more easily detected.
- Attendees specifically identified Sherwood Oaks and The Stands as places with a large aging demographic and no sidewalks. They felt that this could be a problem in the future where senior residents will no longer be able to drive and won't be able to walk due to lack of sidewalks.
- Attendees felt that if Bloomington Hospital were to move outside the city limits, this could reduce the number of people who are able to access this healthcare provider.
- Walkability of neighborhoods, housing and the B-Line are important for an aging population and their ability access their daily needs.

Local Schools:

- The Arlington Valley Trail Park could be better served with walking access to Arlington Heights Elementary School.
- W. Gifford Rd. west of Curry Pike could use a sidewalk to get to Highland Park Elementary.
- Students are unable to cross 10th/45 to get to University School. Though there is a sidewalk, crossing is problematic. A sidewalk constructed on both sides of the road could better serve students walking to school.
- Identified the difficulty to get students from The Stands subdivision to Childs Elementary School via walking or biking.
- Jackson Creek Trail has helped with getting kids to school.
- Feels the Fullerton Pike project with regard to Batchelor School will have little impact as long as there is a traffic signal.
- Commented that the bus pull off on Henderson has been effective.

Emergency Responders:

- The bypass helps with ambulatory access to and from IU campus and the additional lanes have helped with traffic flow/congestion
- There are major backups and dangers on Tapp, Country Club, Rockport, westbound Vernal Pike, Fullerton/Rockport, Victor/Oolitic Quarry
- Supportive of Fullerton Pike connection because they feel that there is a need for more direct routes to and from neighborhoods
- Concerned with access impacts and maintenance needs due to I-69 construction through Indian Creek.
- Dislike the size of Moore's Pike/Renwick roundabout because there is no place for cars to pull over. Emergency vehicles have trouble mounting the curb to get beyond stopped cars
- Feels that school buses and fire trucks need to be considered in the construction of roundabouts
- W. 2nd Street medians are a problem to get emergency vehicles beyond stopped cars especially during rush hour.
- Identified sight distance problems at Winslow/Highland/Allendale. A three-way stop was suggested.
- Suggested that right turns on red should be prohibited on Allen/Patterson
- Identified Burger Road & SR 45 in Van Buren Township as a dangerous area that may be due to poor sight distance to the east
- Identified large amounts of congestion on Friday and Saturday nights on W. 3rd Streets
- One-way streets are not problematic for emergency responders as long as there are plenty of cross streets available.

Travel Surveys (2013)

Voluntary on-line and on-board travel surveys were conducted in the spring of 2013 (March to May). The on-line surveys allowed opportunity for the pubic to provide their household travel information based on a typical week. Similarly on-board travel surveys allowed transit riders to provide their household travel information based on a typical week (with the assistance of Corradino staff and mobile computers). This was the first time this type of survey and data collection was done for the BMCMPO to update the MTP.

The data collected was combined with the 2009 National Household Travel Survey-Indiana (an add-on conducted by FHWA and financed by INDOT). This travel survey information was used twofold. First, to develop a new household model and trip generation methodology based on statistical analysis of the combined household surveys. Second, to create a new destination choice and mode choice models for each trip purpose based on the same household survey.

A total of 273 responses were provided with 173 providing complete travel surveys. Staff assisted residents living in Crestmont public housing to help reach lower-income populations for the survey, as households with higher education and income levels had higher participation rates. Data weighting was used to obtain unbiased results. Methods and methodology is detailed in technical documentation provided by Corradino.

Public Workshops (2013 -2017)

Several public workshops were held in Bloomington and Ellettsville to both inform the public about the MTP process and provide an opportunity to guide its update through public participation. All workshops were structured with an informational session with a question and answer period, followed by breakout workstations. The workstations allowed attendees to select and participate through group discussions/ presentations, map exercises, and/or active forms of participation. Workshops also provided general comment forms and the ability to submit general comments on-line.

Press releases were issued for all workshops, BMCMPO members were notified, and the workshop locations were open and accessible to the general public. Development of the plan and public participation was strategic two fold. First, to generally inform the public about the process, ways to participate, and the fundamental basics a MTP. Second, to build upon previous outreach efforts by engaging the community at milestones of plan development. These milestones centered around first, early in the process with initial needs and issues, then at a mid-point in the process with more technical aspects of the MTP, and finally late in the process for plan adoption. The workshops worked well to draw out public opinion and feedback. A summary of feedback from these milestones is summarized below.

Early Feedback:

Participants were asked to discuss how they would describe current transportation conditions in the community.

- Majority of traffic is high-speed, through traffic
- Distracted drivers/close calls are a problem
- There is a lack of pedestrian crossings across State Route 46
- Concerned that the one-way pairs on SR 46 have created "two islands" out of Ellettsville
- Poor disability access; utility poles block the sidewalks
- High traffic volumes
- At Temperance/Main Streets (one-way pair), traffic moves quickly
- Concerned that as Ellettsville grows, there may be more transportation problems
- Specifically said that there are many accidents at the Arlington/ SR 46 intersection
- Concerned about crime when walking or biking to Ellettsville
- East-West auto connection needed
- Need more convenient, cost-effective public transportation
- Distracted drivers
- North-South travel difficult (except 37)
- Bus service too limited (neighborhoods)
- No pool/bus parking areas
- Buses too big and routes too long
- Easier to be a pedestrian in Bloomington now
- Scooter/motorcycle parker problems
- Need more bike racks

Participants were asked to discuss how the community, transportation system should look like in the future.

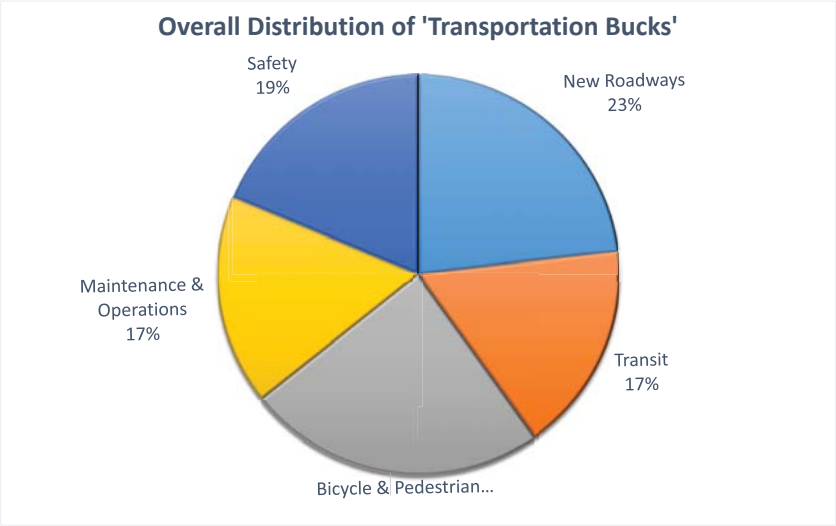
- Construct a bypass south of Ellettsville for SR 46 to reduce congestion
- Concerned that I-69 will result in a wider SR 46 to account for higher traffic volumes
- Want to separate through traffic from local traffic
- Want better management of drainage that is impacted by both transportation and land use density.
- The County plan will inhibit growth and thus more need for public transportation focus on the urbanization of Bloomington. In an urbanized area there will be less use of cars
- More recreational transportation especially East-West
- Needs of aging population
- Major East-West corridor
- Highly developed bus service
- Patterson Park car/bike/ped traffic problems for Prospect Hll
- Smaller buses, shuttle/trolley around core neighborhoods
- More bicycle routes
- Extend transit routes to the counties
- Express bus routes
- Neighborhood centers with parks, pharmacy, stores, medical, etc.
- Shut down downtown to car traffic
- East-West connectivity

Mid-point Feedback:

Participants were asked how to distribute transportation spending. The pie chart illustrates the overall results on allocations of transportation spending.

Plan Adoption Feedback:

- Language should be included within the vision that specifically identifies vulnerable populations such as elderly, young children, and the poor.
- Add information on the funding allocation process
- Explain or detail a set of criteria which are required for a project to be prioritized.



MPO Committees (2010 - 2017)

The Policy, Technical, and Citizen Advisory Committees received on-going status reports as well as opportunity to guide development of the MTP through its development and adoption process. All Committee meetings are open to the public and respective packet information was included for all committee meetings. The involvement of the MPO Committees help provide guidance to staff and kept members informed throughout the multiyear process to develop and adopt the MTP.

Final Public Open House (2017)

The final draft of the MTP was available for public review prior to adoption by the committees of the BMCMPO. An Open House was held to provide an opportunity to learn about key aspects to the plan, to provide final comments on the plan, and to learn about the adoption process.

Interagency Consultation & Coordination (2012 -2017)

BMCMPO staff consulted and coordinated with state and federal transportation agencies to ensure minimum requirements were attained as well as to respond to any additional feedback received. This consultation and coordination helped ensure the MTP had the appropriate technical reviews before a final MTP was adopted.

Technical Assistance

Technical assistance for the 2040 Metropolitan Transportation Plan was provided by The Corradino Group. General details of their data collection, methodologies, and model development are provided in Appendix C. The Corradino Group helped the MPO achieve the following objectives:

Data Collection

The Corradino Group collected household travel behavior via an online survey to supplement the travel data already available as well as the National Household Travel Survey (NHTS). The online survey collected information such as household size, income, auto ownership, mode, and usual weekly household destinations. An on-board transit survey was also used for Bloomington Transit and Indiana University Bus Systems. The survey was designed to collect rider information such as demographics, household income, automobile availability, origins, and destinations.

Socioeconomic Forecasts

Develop a range of countywide socioeconomic forecasts for the year 2040. These forecasts are necessary to allocate household and employment values to the Traffic Analysis Zones (TAZ) used to model travel demands. Three forecasts or growth styles were used as for comparison: "Low"; "Mid-Range"; and "High Growth". These socioeconomic forecasts are based on recent development trends as well as reasonable expectations for future growth within Monroe County.

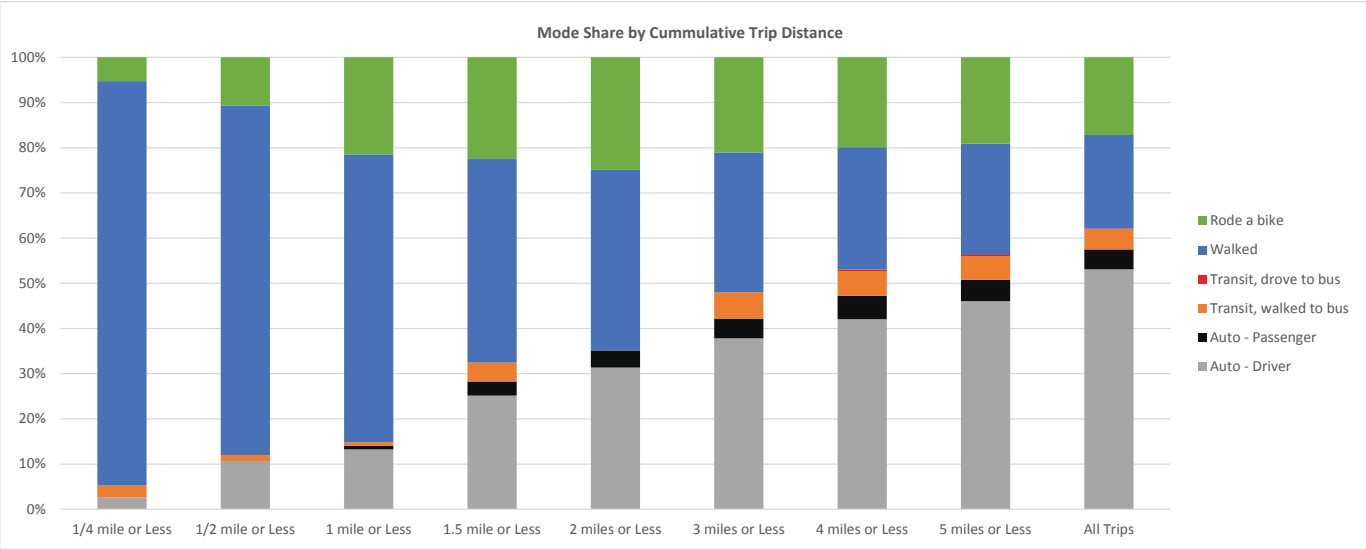
Land Use Forecasts

Develop a range of countywide land use forecasts for the year 2040. These land use development patterns are closely tied to zoning and subsequently transportation needs. Three land use forecasts were used for comparison: "Standard"; "Compact"; and "Low Density". These land use forecasts are based on existing land use controls or possible changes to guide new development. Together with the socioeconomic forecasts, a total of nine different forecast modeling options were created. These ranged from low growth and compact development to high growth and low density development. Once a preferred socioeconomic and land use forecast scenario is selected, future travel demands could be modeled to help the community better understand future needs as well as evaluate future scenarios.

Travel Demand Model

Develop a travel demand computer model that accounts for existing travel behaviours of Monroe County residents and visitors on the existing transportation network as well as under future scenarios. Develop a range of performance measures, so the model is a useful tool to compare current and future conditions out to the year 2040. Federal legislation requires that all MPOs establish performance measures on the use, condition, and impact of the transportation system. In addition to these requirements, BMCMPO performance measures are also based on the Guiding Principles, outlined in Chapter 2. Performance measures are a means to evaluate desired results and progress over time. Chapter 5 proivdes more details on the performance measures used for the MTP. Below is a summary on the categories and attributes used for each performance measure.

BMCMPO Travel Survey Results



Travel Demand:

- Person trips per day
- Daily vehicle trips
- Daily vehicle miles
- Daily vehicle hours
- Daily transit boarding's
- Mode shares

Safety:

- Predicted number of accidents
- Fatal, Injury, Property

Travel Efficiency:

- Vehicle hours of delay
- Accessibility by mode
- Number of jobs within X minutes
- Shopping within X minutes
- Transit person hours
- Weighted average transit walk distance
- Weighted average transit headway
- Five Urban Design Variables

Economic:

- Infrastructure costs
- Monetized System User benefits (time, cost, etc.)
- Potential jobs impacts
- Prosperity index

Enviornmental:

- Greenhouse gas emission tonnage
- GHG per trip
- GHG per capita

Ultimately, the travel demand model allows a range of projects together with policies and even conditions be compared to one another to aid in the decision making process for choosing a preferred course of action. Technical documentation by Corradino is available for more in-depth details on the TDM.

D Appendix

Travel Demand Model

Overview

This appendix is a general summary to provide an overview on the general technical aspects to the BMCMPO travel demand model (TDM). The following provides an overview of the model, the network attributes, traffic analysis zones, trip generation, destination and mode choice, and traffic assignments and validation. More detailed technical documentation issued by The Corradino Group is available upon request.

Model Overview

The BMCMPO maintains a TDM covering Monroe County utilizing TransCAD software. The BMCMPO model serves as an analytical resource for the Bloomington-Monroe County area.

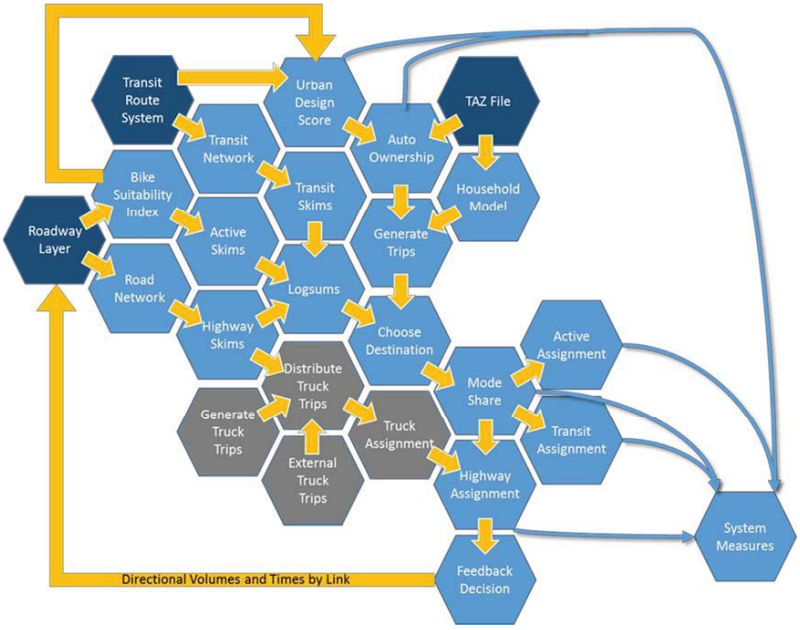
The BMCMPO model is designed primarily for use in transportation planning efforts at a regional scale and is a useful tool for the development of the long-range BMCMPO 2040 Metropolitan Transportation Plan (MTP).

The model is designed and calibrated for macro-level regional planning activities, more detailed studies would be necessary for specific project-level analyses. The model does incorporate local data, along with good professional judgment, as part of the validation process. Basic model components use mostly a conventional trip-based travel demand model. It also uses aggregate land use/socioeconomic data and road/transit network data to estimate facility-specific roadway traffic volumes and transit demand.

Conventional TDMs use a four step process. Each step of the TDM simulates the traveler's decision-making on one aspect of trip making: trip generation predicts whether to make a trip, trip distribution finds where to go, mode split figures out which transportation mode to use, and traffic assignment estimates which route to take for the trip. This conventional approach follows four sequential steps:

- Trip Generation - this initial step translates household and employment data into person trips using trip generation rates established during model calibration.
- Destination Choice - the second step estimates how many trips travel from one transportation analysis zones (TAZ) to any other zone. The distribution is based on the number of trips generated in each of the two zones, and on factors that relate the likelihood of travel between any two zones to the travel time between the two zones.
- Mode Choice – the third step estimates the proportions of the total person trips which use transit and ride-sharing modes as opposed to single occupant vehicles for travel between each pair of zones.
- Trip Assignment - the final step assigns trips from one zone to another to specific travel routes between the zones. The assignments to routes do consider effects, such as traffic congestion.

The TDM uses a feedback loop to pass congested speeds back through the modeling steps so that trip distribution and mode choice components produce results that are consistent with modeled congestion for a given scenario. This generalized process is



shown in the feedback illustration below.

Development of the TDM requires various data and information to run each of the four steps of the TDM. Much of this data and information are attributes assigned to each TAZ. Statistical analysis, network attributes, and other parameters are used to establish a Base Year (2013) condition used to compare future conditions or scenarios using the same four-step process, but with projected data values. The general aspects of Transportation Analysis Zones, Trip Generation, Destination and Mode Choice, and Traffic Assignment and Validation are provided below to illustrate relationships of data, attributes, and model parameters used for the TDM.

Transportation Analysis Zones (TAZ)

Originally based on 2010 Census Block geography, a total of 591 (including 34 external stations) TAZs were developed. Each TAZ contains socioeconomic, population, household characteristics, employment and school enrollment data for key attributes. Significantly more TAZs than the previous TDM allowed a more refined level of detail analysis for key spatial attributes. This includes group quarters associated with Indiana University which typically have not been accounted for within TAZ development in the past.

Population and household data from the 2010 Census were also aggregated into each TAZ. This process resulted in total 137,976 population and 68,624 households in Monroe County. Household and economic data from the Census were also used for TAZ attributes. This approach is used to represent key household characteristics, which typically affect the number of trips made by household members (e.g. average household size, median household income, average number of workers per household, average number of vehicles per household).

School enrollment and employment are other key attributes aggregated into each TAZ. For school enrollment, a total of 14,660 K-12 and 50,948 university enrollments (41,997 for IU and 8,951 for Ivy Tech) for Monroe County were assigned. For employment, a total of 79,738 employees for Monroe County were also assigned by North American Industry Classification System (NAICS-based) employment types. This resulted in 8,376 Retail, 10,066, Industry, 3,140 Office, and 58,156 Service employment type assignments.

Another attribute of TAZs used was to classify them by area types (rural, suburban and urban). This information is required for speed and capacity estimation of network links. The area types were determined by combined criteria of population and employment density for each TAZ and followed the following guidelines:

TAZ Classification

Area Type	Population Density (Persons/mile2)		Employment Density (Jobs/mile2)
Rural	Less than 1,500	AND	Less than 400
Suburban	400 to 1,000	OR	1,500 to 2,000
Urban	1,000 or greater	OR	2,000 or greater

Trip Generation

The initial step of the TDM is trip generation. Attributes assigned to each TAZ are used to translate this information into person trips using trip generation rates, household worker stratification curves, and household market segmentation (automobile ownership). Approximately 75% of the households have two people and two or less workers. Household stratification is used because the workers and size of the household strongly influence the trip generation (e.g. home-based work, home-based other, home-based shop, home-based school).

Likewise the market segmentation also strongly influences trip generation when factoring in the number of autos available to adult household members. The auto ownership variable is key to the trip generation process. The inclusion of the auto ownership model will allow the regional travel model to be sensitive to different types of urban development and/or non-auto infrastructure (transit and non-motorized). Categorizing household automobile ownership into Zero Auto, Autos Less than Workers, Autos Greater than Workers was used for the market segmentation of the trip generation process.

Truck trips is another aspect that the TDM incorporates into the trip generation step. Generally truck trips are not based upon household information, but

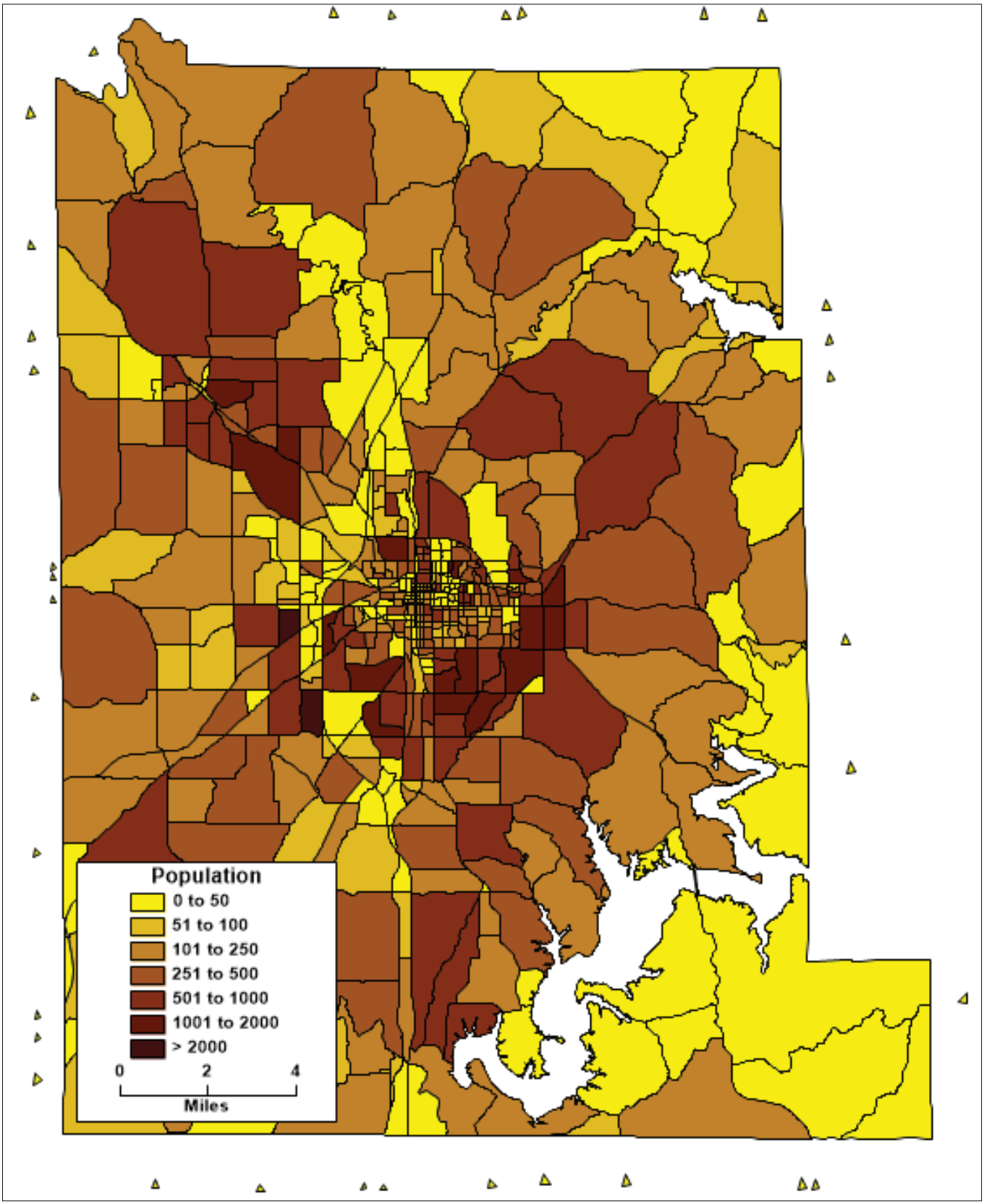


Illustration : Monroe County TAZ and Respective Population Values

are related to the employment aspect and trips generated by commerce.

Destination and Mode Choice

The next step of the TDM first estimates how many trips travel from one TAZ to another TAZ. The distribution is based on the number of trips generated in each of the two zones, and use factors such as the likelihood of travel between any two zones to the travel time between the respective two zones. This includes time of day factors, peak travel, and other attributes to estimate trips. Another aspect that the TDM uses is a congested travel time feedback loop. This is helpful when assessing consistency with air quality and travel speeds as they are interrelated.

Next the TDM estimates the proportions of the total person trips by mode type between each pair of zones. This Mode Choice step uses a regression or logit model to assign the probability of using a particular travel mode based upon the utility of that mode in relation to the sum of the utility for all modes. The utility measure is specific to each travel mode, while the coefficients for travel time and cost are generally held constant for all modes for a given trip purpose and population. This regression assumes an improvement in one mode will divert trips proportionately from all other modes. For example, a transit improvement that attracts an additional five percent of all trips would reduce trips on all other modes by five percent. It also has the ability to recognize the potential for something other than equal competition among modes. In this instance, a reasonable assumption for a premium express transit service would attract more diversion from the parallel local bus service than from the auto modes. Finally it also relates the mode choice to the type of trip generation (e.g. home-based work, home-based other, home-based shop, home-based school).

It is important to note that this Mode Choice step now offers functionality that was not previously factored with previous BMCMPO TDMs. In the past, modes other than automobile were not modeled by the TDM and were simply assumed being accounted for indirectly since data attributes were almost solely associated with automobile travel.

Another unique aspect of the BMCMPO TDM is including urban design attributes. There are strong correlations between land uses and transportation needs. A "5D Score" was developed to better relate the land development types and their impact on travel behavior (e.g. low density tends to favor high VMT and high density tends to favor low VMT on a per capita basis). The 5D Scores used Density, Destination, Design, Diversity, and Distance to Transit as part of the Mode-Choice step.

Traffic Assignment and Validation

Accurately representing the transportation network of Monroe County is a fundamental part for the successful validation of the BMCMPO TDM. The City of Bloomington and Monroe County provided roadway traffic counts and transit ridership data, and a variety of GIS files of roadways, transit routes, bike routes, trails/paths, traffic signals and parcels data. All these data were used for developing a model network which accurately represents the transportation infrastructure conditions in Base Year 2013. Technical analysis considered aspects of future networks, highway speeds, capacity estimation, delays, external stations, growth rates, truck traffic, transit network, and other network attributes.

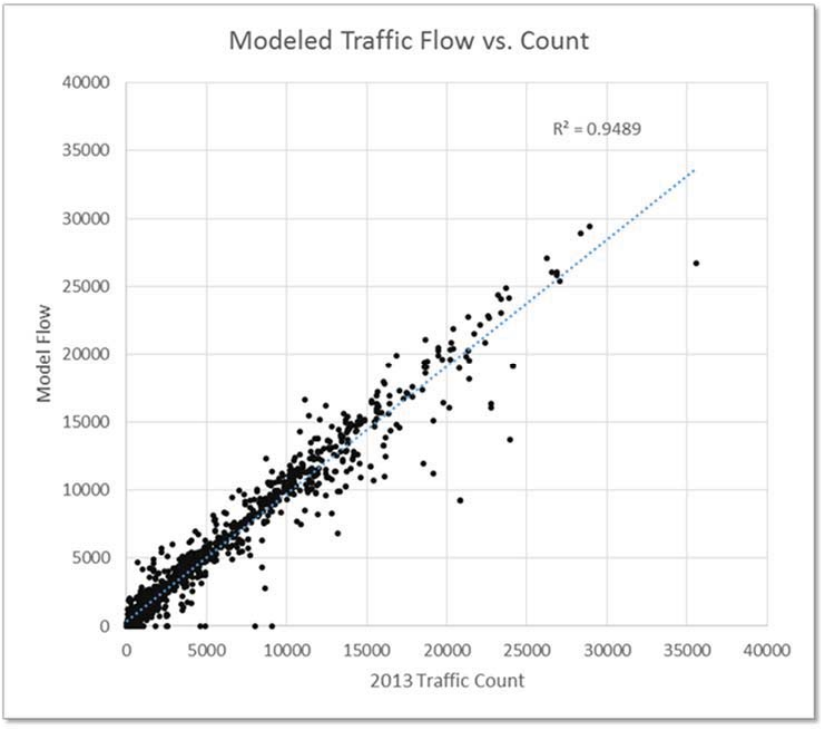
The trip assignment step is the last step of the conventional four-step model process. In general, trips from the various trip generation tables are assigned to the network according to mathematical algorithms that ensure that all zone to zone trips use paths that minimize the total travel time of all trips on the network. This step is also the last step in the feedback loop that returns updated highway travel times to the trip distribution step which generates revised trip tables based on these updated travel times. This loop ensures that consistent, stable highway travel times are established before the final set of highway and transit trips are assigned to the network. Trip assignment used the following steps for traffic assignment: Highway Assignment (equilibrium assignment for peak periods, off peak period, by single occupancy vehicle, high occupancy vehicle, trucks, bikes, and

pedestrians), Congested Travel Speeds (standard Bureau of Public Roads curves), and Count Data (local, INDOT).

TDM validation is measured against the Base Year (2013) observed data for the region. Calibration of the TDM takes place at each step in the model process and involves initial estimation and then refinement of the various parameters and coefficients of the model components by comparing model results to observed conditions. This is done until calibration refinements have resulted in satisfactory results. Once validated, the model can be used to predict future travel patterns with a high degree of confidence.

The Root Mean Squared Error (RMSE) method is used to validate for different volume, facility and area types. In regard to RMSE, The model is generally within the desirable range of error for high-volume roads and overall, but above desirable targets for low-volume roads, which are more difficult to replicate, given the inherently smaller margins of error afforded.

The 2013 Base Year model is performing well with a validation against counts to show an overall 26.2% RMSE and 1.5% count VMT error. The system-wide modeled 2013 Base Year VMT estimate is consistent with the 2005 HPMS estimate (within -5%). The figure below shows the estimated traffic flow vs. the actual traffic counts as part of the validation.



E Appendix

Environmental Justice

Federal Statutes

Title VI of the Civil Rights Act of 1964 requires that no person in the United States shall on the grounds of race, color, national origin, gender, age, or disability be excluded from participation in, or be denied the benefits of, or be subjected to discrimination under any provision or activity of federal aid recipients, subrecipients or contractors. Title VI established a standard of conduct for all Federal activities that prohibits discrimination. By the 1990s, concerns over the high and adverse environmental impacts of private or government actions that were disproportionately high and adverse to human health, or environmental effects, on minority populations and low-income populations, resulted in Executive Order 12898.

Executive Order 12898, issued on February 11, 1994, titled Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and the President's Memorandum on Environmental Justice, directed every federal agency to make environmental justice part of its mission by identifying and addressing the effects of all programs, policies and activities on "minority populations and low-income populations".

Now the totality of significant individual or cumulative human health, or environmental adverse effects must be addressed. Furthermore, disproportionately high incidents borne by predominantly minority and/or low-income populations (appreciably more severe or greater in magnitude than the adverse effects borne by non-minority and/or non low-income populations), must also be addressed. Thus instituting the term Environmental Justice (EJ) ensures equal protection under the country's laws, including the following:

- National Environmental Policy Act of 1969 (NEPA)
- Title VI of the Civil Rights Act of 1964
- Section 504 of the Rehabilitation Act of 1973
- Age Discrimination Act of 1975
- 23 United States Code 324
- Title II of the American with Disabilities Act of 1990
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970

Environmental justice applies to transportation in many ways. EJ must be integrated into every transportation decision from the beginning concepts through post-construction operations and maintenance (policy decisions, systems planning, project development and NEPA review, preliminary design, final design, right of way, construction, operations and maintenance). All policies, programs, and other activities that are undertaken, funded, or approved by FHWA, FTA, or other US DOT components must comply with EJ requirements. In regards to the Metropolitan Transportation Plan, generally the underlying principle of Title VI is that minority and low-income residents should:

- participate in the planning process;
- benefit from planned transportation improvements; and
- not bear an unfair burden of the environmental impacts.

The Plan estimates growth patterns and future transportation needs which helps to address the benefits and burdens that future transportation projects might have on disadvantaged populations. Plan development provides growth projections to evaluate, opportunities for all populations to provide input (Public Participation Plan), assess the effects of future decisions on neighborhoods, the environment, and the economy, and help ensure that the benefits and impacts of future transportation systems are equally distributed.

Methodology & Results

Demographic and socioeconomic data from the American Community Survey (ACS), for each of the 16 Census Tracts of Monroe County, was obtained. The data was analyzed by percent of minority populations and percent below poverty status by tract. The percentage of both non-white and below poverty status populations by Census Tract is summarized in Table XX. Individual tracts are identified by two EJ characteristics:

- high minority tracts - 50 percent or more of the residents in the tract were "minority" populations; and
- low income tracts - 50 percent or more of the individuals within the tract were classified as living in poverty status.

Census Tracts with 50 percent or more of either of the two EJ characteristics are locations of importance for transportation planning purposes. The EJ Census Tracts (EJ Tracts) with high incidents of poverty and minority populations for Monroe County are:

- **Census Tract 1** covering the Bloomington Central Business District and immediate surrounding areas;
- **Census Tract 2.01** covering the northern portion of the Indiana University campus;
- **Census Tract 2.02** covering the southern portion of the Indiana University campus;
- **Census Tract 6.02** covering the northwestern portion of the City of Bloominton; and
- **Census Tract 16** covering the area north of downtown and immediately northwest of the Indiana University campus.

These EJ Tracts are mapped with the proposed transportation projects on Figure XX. This is a useful means to assess the spatial relationship between projects and EJ compliance for the MTP. EJ Census Tracts cover most of the Indiana University campus and or have high concentrations off-campus housing desired by student populations. The high percentage below poverty classification for these tracts is very likely a reflection of the large number of students residing within these Tracts. Furthermore, Tract 2.02 has a high minority proportion and this may also be influenced by large number of students living on campus, particularly international students. By comparison, the Bloomington Housing Authority manages a large low-income housing complex within Tract 6.01 as do several other agencies within this tract. Tract 6.01 is close to meeting the EJ characteristics, but offers some context when comparing it to the EJ Tracts that have high student populations. Because projects are within these EJ Tracts, a higher level of analysis during the Red Flag Analysis will be necessary when project funding is being considered for a Transportation Improvement Plan (TIP). This in turn may require the need to address specific EJ concerns as a project moves forward with implementation. Currently, no residential displacements are anticipated for any project within a EJ Tract. For MTP planning purposes the following projects are within EJ Tracts:

17th Street reconstruction;

TBD

TBD

TBD

TBD

TBD

TBD

Another consideration for EJ is transit service. Figure XX compares Census Tracts with the fixed route system of Bloomington Transit as another means to assess EJ spatial relationships. IU Campus Bus provides transit service within and in close proximity to Indiana University (Tracts 2.01, 2.02, and 16) and Rural Transit provides services throughout the county. Together Bloomington Transit, IU Campus Bus, and Rural Transit provide a range of transit services to all EJ Tracts within Monroe County. Future transit investments supported by the MTP will continue to enhance mobility and service for populations within EJ Tracts.

Conclusion

The multi-modal transportation improvements contained in the 2040 MTP will benefit areas with a concentration of low-income households through improved mobility and accessibility without having a "disproportionately high" or "adverse" effect. In fact, no households will be displaced in implementing transportation improvements in these low-income or high minority areas. Finally, the 2040 MTP makes multi-modal transportation investments within, and to, low-income areas ensuring that low-income groups receive a proportionate share of benefits, without enduring adverse impacts. Thus, the Year 2040 MTP is in compliance with Title VI, relative to Environmental Justice.

Table XX details the Census Tract and respective population and poverty results regarding Title VI requirements for the BMCMPO area. Highlighted cells are locations of importance for Title VI transportation planning purposes

Census Tract	Population	White	Non-White	% Minority	% Below Poverty
1.00	5286	4656	630	11.9%	72.7
2.01	564	124	440	78.0%	65.6
2.02	60	56	4	6.7%	81.7
3.01	4542	3710	832	18.3%	41.7
3.02	2926	2716	210	7.2%	35.4
4.01	4358	3534	824	18.9%	31.1
4.02	4605	3599	1006	21.8%	24.7
5.01	4238	3683	555	13.1%	21.2
5.02	3438	2944	494	14.4%	12.3
6.01	4347	3051	1296	29.8%	47.9
6.02	3137	2350	787	25.1%	59.1
7.00	2666	2434	232	8.7%	8.9
8.00	5924	5085	839	14.2%	18.3
9.01	2930	2170	760	25.9%	43.1
9.03	5063	3966	1097	21.7%	31.5
9.04	5469	3293	2176	39.8%	43
10.01	5064	4072	992	19.6%	6.2
10.02	5601	4553	1048	18.7%	12.2
11.01	5241	4369	872	16.6%	27.1
11.02	4490	3655	835	18.6%	17.1
11.03	3130	2734	396	12.7%	9.9
12.00	6043	5840	203	3.4%	4.7
13.01	5825	5655	170	2.9%	10.4
13.03	5894	5669	225	3.8%	3.4
13.04	3985	3526	459	11.5%	8.5
13.05	2132	2069	63	3.0%	4.7
14.01	2230	2161	69	3.1%	9.1
14.02	5249	4956	293	5.6%	11.7
15.01	5452	5327	125	2.3%	5
15.02	2842	2745	97	3.4%	10.7
16.00	4971	4355	616	12.4%	76.9

Source: U.S. Census Bureau / ACS 2015 5 Year Estimate

F Appendix

Air Quality

Overview

The Clean Air Act of 1971 required the development of a State Implementation Program (SIP) for achieving National Ambient Air Quality Standards (NAAQS) in non-attainment areas. The relationship between transportation planning and air quality planning was formalized with the Clean Air Act Amendments of 1990, which establish a direct relationship between projects in the metropolitan Transportation Improvement Program and air quality compliance.

Under current Federal requirements, an air quality conformity determination is required for major transportation investments in designated air quality "non-attainment" and "maintenance" areas. The composite of major transportation investments contained in an urbanized area long-range transportation plan must therefore demonstrate air quality improvement or, at minimum, no degradation in air quality relative to the "Existing Plus Committed" transportation network.

Compliance

Monroe County and Bloomington have not been subjected to Federal air quality requirements because Monroe County and the City of Bloomington currently meet Federal air quality standards, and the region is in "attainment" for each of the criteria pollutants.

Although a conformity determination is not needed for the Bloomington urbanized area, the projects programmed in the Cost Feasible Plan for the 2040 Metropolitan Transportation Plan will result in an improvement to air quality. The analysis completed for the 2040 MTP initially showed that traffic congestion would increase for the "no-build" (Existing Plus Committed) transportation network over the next two decades years because of increased:

- System-wide volume-to-capacity ratios;
- Road miles operating below Level-of-Service "C" or "D";
- Vehicle-miles of travel on facilities operating on below Level-of-Service "C" or "D";
- Congested vehicle-hours of travel; and
- Total vehicle-miles of travel.

Since congestion and air quality are correlated to vehicle speeds, total vehicles, and vehicle-miles of travel, air quality would degrade over the Year 2040 forecast period if no further major transportation investments are made in the Bloomington urbanized area. In other words, an increase in mobile source generated carbon monoxide and ozone (hydrocarbons and nitrous oxides) will occur under a "no-build" Transportation Plan alternative.

Conversely, the recommended set of projects in the 2040 MTP Plan focus on alternative transportation and public transportation while adding modest roadway capacity will result in air quality improvements over the no-build condition through the achievement of reductions in:

- System-wide volume-to-capacity ratio;
- Congested roadways;
- Vehicle-miles of travel on congested roadways; and
- Congested vehicle-hours of travel.

Forecasted growth in population, employment, and income will bring about increased transportation demands within the BMCMPO area during the forecast period extending to Year 2040. The recommendations of the 2040 Metropolitan Transportation Plan will, however, contribute to overall air quality improvement through a systematic application of transportation capacity preservation, minimal capacity expansion projects, and continued system growth of the bicycle/pedestrian and public transit systems.

G Appendix

Projects

Projects

The following Projects Index provides a central reference point for descriptions of recommended multi-modal transportation improvement projects listed in the BMCMPO 2040 Metropolitan Transportation Plan.

The project descriptions provided here represent the initial points for design at the time of project implementation, subject to future funding availability and other constraints.

Project Cost Estimation

Estimating project costs is a critical step for project selection, project programming and project scheduling. The 2040 Metropolitan Transportation Plan used a multi-step process to calculate individual infrastructure project costs.

1. BMCMPO staff analyzed project construction costs as documented in past BMCMPO Transportation Improvement Programs and developed average construction costs by associated project type. These costs were then recalculated based on project length and assigned a derived dollar per mile cost.
2. Individual project types included added travel lanes, pavement replacement, road rehabilitation, road reconstruction, new road construction, converting a rural design roadway sections to urban cross sections, signal installation/replacements, sidepath/trail construction and many other similar projects.
3. The length of each project was measured through the use of GIS software.
4. Costs were calculated for each project by multiplying the cost per project type (Step 1) by the project length (Step 2).
5. Project costs were then recalculated to reflect the year of construction. Year of construction costs were established by determining a cost estimate in the base year (2018) and applying a constant dollar annual inflation rate of 2.0% for the final project cost.

Project Index

City of Bloomington Projects

2nd Street/Bloomfield Road (Phase I)

Start:	Rogers Street
End:	Walnut Street
Length:	0.3 miles
Description:	Road widening to four lanes (five lanes including the continuous center turn-lane).
Bicycle/Pedestrian:	(a) On-street bike lanes with sidewalks on both sides of road; or (b) Sidepath on one side of road with sidewalk on other side of road.

2nd Street/Bloomfield Road (Phase II)

Start:	State Road 37
End:	Patterson Drive
Length:	1.8 miles
Description:	Road widening to four lanes (divided).
Bicycle/Pedestrian:	(a) On-street bike lanes with sidewalks on both sides of road; or (b) Sidepath on one side of road with sidewalk on other side of road.

2nd Street/Bloomfield Road (Phase III)

Start:	Patterson Drive
End:	Rogers Street
Length:	0.5 miles
Description:	Road widening to four lanes (five lanes including the continuous center turn-lane).
Bicycle/Pedestrian:	(a) On-street bike lanes with sidewalks on both sides of road; or (b) Sidepath on one side of road with sidewalk on other side of road.

10th Street/14th Street

Start:	Dunn Street
End:	State Road 45/46 Bypass
Length:	2.9 miles
Description:	Road reconstruction to two lanes and creation of one-way pair.
Bicycle/Pedestrian:	On-street bike lanes with sidewalks on both sides of road.

17th Street

Start:	Vernal Pike
End:	State Road 45/46 Bypass
Length:	3.0 miles
Description:	Construction of new two lane road connection between Crescent Road and Vernal Pike (crossing State Road 37); 8 intersection modernizations/improvements between State Road 37 and State Road 45/46 Bypass.
Bicycle/Pedestrian:	(a) On-street bike lanes with sidewalks on both sides of road, or (b) Sidepath on one side of road with sidewalk on other side of road; Provide exclusive bicycle and pedestrian crossing of State Road 37.

Adams Street

Start:	Rockport Road
End:	Allen Street
Length:	1.8 miles
Description:	Construction of new two lane road connection (to be implemented by future development).
Bicycle/Pedestrian:	Sidepath on one side of road

	with sidewalk on other side of road.

Dunn Street

Start:	12th Street
End:	13th Street
Length:	0.1 miles
Description:	Construction of new three lane road connection with railroad crossing; extension of Dunn Street /Indiana Avenue one-way pair to 17th Street.
Bicycle/Pedestrian:	Sidewalks on both sides of road.

Moores Pike

Start:	College Mall Road
End:	State Road 446
Length:	1.4 miles
Description:	Road widening to three lanes.
Bicycle/Pedestrian:	(a) On-street bike lanes with sidewalks on both sides of road, or (b) Sidepath on one side of road with sidewalk on other side of road.

Smith Road (Phase I)

Start:	Moores Pike
End:	3rd Street
Length:	1.0 mile
Description:	Road widening to three lanes.
Bicycle/Pedestrian:	Sidepath on one side of road with sidewalk on other side of road.

Smith Road (Phase II)

Start:	Rogers Road
End:	Moore's Pike
Length:	1.0 mile
Description:	Road widening to three lanes.
Bicycle/Pedestrian:	Sidepath on one side of road with sidewalk on other side of road.

Sudbury Drive

Start:	Weimer Road
End:	Rogers Street
Length:	1.4 miles
Description:	Construction of new two lane road connection (to be implemented by future development).
Bicycle/Pedestrian:	Sidepath on one side of road with sidewalk on other side of road.

Tapp Road/Country Club Drive/Winslow Road/ Rogers Road

Start:	Weimer Road
End:	Smith Road
Length:	4.7 miles
Description:	Road reconstruction to two lanes (divided) from Weimer Road to Rogers Street; Road widening to four-lanes (divided) from Rogers Street to Henderson Street; Road reconstruction to two lanes (divided) from Henderson Street to Smith Road.
Bicycle/Pedestrian:	Sidepath on one side of road with sidewalk on other side of road.

Weimer Road

Start:	Wapehani Road
End:	Bloomfield Road
Length:	0.7 miles
Description:	Reconstruction for two lanes.
Bicycle/Pedestrian:	Sidepath on one side of road with sidewalk on other side of road.

CSX Corridor Trail

Start:	Adams Street
End:	Country Club Drive
Length:	2.4 miles
Description:	Multi-use bicycle and pedestrian trail.
Bicycle/Pedestrian:	Multi-use bicycle and pedestrian trail.

Jackson Creek Trail

Start:	Moores Pike
End:	Clear Creek Trailhead
Length:	12.1 miles
Description:	Multi-use bicycle and pedestrian trail.
Bicycle/Pedestrian:	Multi-use bicycle and pedestrian trail.

H Appendix

Glossary

Terms

3C Planning means Comprehensive, Cooperative and Continuous transportation planning process.

Analysis Area means any geographic area such as a zone or group of zones combined for the purpose of making an analysis.

Apportionment means any method for dividing federal funds by an established formula. An apportionment operates like a line of credit to sub-federal governments.

Authorization means the level of funding designated by Congress for specific legislation.

Average Daily Traffic (ADT) means the average number of vehicles passing a specified point during a 24 hour period.

Bike Lane means a portion of the road that has been designated and designed for the exclusive use of bicycles with distinct signage and pavement markings.

Bloomington Transit (BT) is a municipal corporation that provides public transportation within the City of Bloomington limits.

Bottleneck means the point of minimum capacity along a highway segment.

Build Condition, Option, Alternative or Alternate means a transportation plan, program or alternative involving a major capital investment.

Capacity means the maximum rate of flow at which persons or vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic and control conditions, usually expressed in vehicles per hour or persons per hour.

Capacity Expansion Projects means major transportation investments that expand the capacity of any highway or transit system to accommodate additional vehicles. Highway expansion projects involve projects that add through travel lanes including major roadway widening, new roadways, new freeway interchanges, and substantial realignments of existing roadways.

Capacity Preservation Projects means transportation investments to preserve the capacity of the existing highway or transit system. Such projects include bridge rehabilitation and replacement, pavement rehabilitation and reconstruction, and low capital cost investments such as traffic signal improvements or safety improvements (e.g. guardrails and minor horizontal/vertical curve realignments). Typical transit projects involve bus and equipment replacement, transit shelters, and garage facility maintenance.

Carpool means any vehicle (usually a car) or arrangement in which two or more occupants, including the driver, share use or cost in traveling between fixed points on a regular basis (also referred to as ridesharing).

Census Tract means small areas with generally stable boundaries, defined within counties and statistically equivalent entities, usually in metropolitan areas and other highly populated counties. They are established by the U.S. Census Bureau to be relatively homogeneous with respect to population characteristics, economic status, and living conditions.

Central Business District (CBD) means an area of a city that contains the greatest concentration of commercial activity. The traditional downtown retail, trade and commercial area of a city or an area of very high land valuation, traffic flow, and concentration of retail business offices, theaters, hotels and services.

Citizens Advisory Committee (CAC) is a committee, organized under the MPO, that is comprised of citizens representing a broad spectrum of the community. The committee is tasked with providing recommendations to the Policy and Technical Advisory Committee on transportation-related topics that affect the MPO.

Committed Improvement means transportation investments for which funds have been programmed. This includes projects that are under construction, but not yet open for operation. In the most stringent sense, committed improvements involve projects for which funds have been programmed through the construction phase. In the least stringent sense, committed projects may involve proposed projects for which design has been completed and any environmental clearances have been received such that the project may be scheduled for bid letting.

Comprehensive Planning means a planning process that requires inclusion of land use, transportation, water and sewage, education, health and other elements.

Cross-Town Routes means a non-radial bus or rail service which does not enter the Central Business District.

Daily Vehicle Miles Traveled (DVMT) means the total number of miles driven per day in a specified area by all vehicle types.

Deadhead Miles means the miles a transit vehicle travels without passengers or cargo on board, often to and from a garage or from one route to another.

Discrimination means any intentional or unintentional act, or any failure to act, which has the effect of excluding or denying a person from participation in benefits, or has otherwise subjected a person to unequal treatment under any program or activity because of race, color or national origin.

Divided Highway means a multi-lane facility with a positive barrier median, or a median that is 4 feet or wider.

FAST Act means the Fixing America's Surface Transportation Act enacted on December 4, 2015, funding surface transportation programs. It authorizes a $305 billion investment over fiscal years 2016 through 2020 with provisions for streamlining, performance-based measurements and multi-modal transportation.

Federal Fiscal Year (FFY) means a twelve month period for which records are kept. The Federal Fiscal Year is from October 1st to September 30th.

Federal Highway Administration (FHWA) is part of the U.S. Department of Transportation and is responsible for administering federal-aid transportation funds and programs.

Federal Transit Administration (FTA) is part of the U.S. Department of Transportation and is responsible for administering federal-aid public transportation funds and programs.

Geographic Information System (GIS) means spatial data, presented in an electronic map format, which geographically represents the geometry of the highways, an electronic map) and its geographically referenced component attributes data that are integrated through GIS technology to perform analysis.

Grant means an agreement between the federal government and a state or local government, whereby the federal government provides funds or aid-in-kind to carry out specified programs.

Highway means any road, street, parkway, or freeway/expressway that includes right-of-way, bridges, railroad/highway crossings, tunnels, drainage structures, signs, guardrails, and protective structures in connection with highways.

Indiana Department of Transportation (INDOT) is the agency that administers and funds transportation needs within the State of Indiana.

Indiana Statewide Transportation Improvement Program (INSTIP) is Indiana's multiyear program of transportation projects that is comprised of the Transportation Improvement Programs from all of the State's MPOs.

Land Use means the purpose for which land or a structure on the land is being used.

Level Of Service (LOS) means a qualitative measure describing operational conditions within a traffic flow stream, generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort, convenience and safety. Typically, a scoring system of A through F is used to describe the level of service. For highways, the LOS definitions found in the *Highway Capacity Manual* (Transportation Research Board Special Report 209) are used.

Local Share is the non-federal matching funds provided by a local entity to secure federal matching funds.

Long Range Transportation Plan (LRTP or Plan) means the official multi-modal transportation plan adopted by the MPO for the metropolitan area in accordance with Federal metropolitan transportation planning guidelines. As a minimum, the transportation plan must have a twenty year horizon and must be updated every five years (every three years in air quality non-attainment areas).

Maintenance Area means any geographic region of the United States designated as non-attainment pursuant to the Clean Air Act Amendments of 1990 (Section 102e, United States Code 7410 et seq.) and subsequently redesignated to attainment status subject to the requirement to develop a maintenance plan under Section 175 of the Clear Air Act as amended.

Major (metropolitan) Transportation Investment means a high-type highway or transit improvement of substantial cost that is expected to have a significant effect on capacity, traffic flow, level of service, or mode share at the transportation corridor or sub-area scale.

Mass Transportation/Mass Transit means the provision of general or special transportation service, either publicly or privately, to the public on a regular and continuing basis in an urban area. This does not include a school bus, charter or sightseeing service.

Management System means a systematic process, designed to assist decision-makers in selecting cost effective strategies/actions to improve efficiency and safety of, and protect the investment in the nation's infrastructure. Typical management systems include the pavement management system, bridge management system, transit management system, congestion management system, safety management system, and intermodal management system.

MAP-21 means Moving Ahead for Progress in the 21st Century Act signed into law in July 2012. MAP-21 consolidated federal funding programs by two-thirds, streamlined environmental reviews, altered bicycle and pedestrian funding, granted development of a national fright policy, and allowed for greater use of innovative financing.

Metropolitan Planning Organization (MPO) means the forum for cooperative transportation decision-making for the metropolitan planning area. The MPO is designated by the Governor of each state and is composed of the chief-elected officials of the metropolitan planning area.

Metropolitan Planning Area (MPA) is the transportation planning area designed by the MPO. As a minimum, the MPA must cover the Urbanized Area (UZA) and the contiguous areas likely to become urbanized within the twenty year forecast period covered by the metropolitan transportation plan.

Metropolitan Transportation Plan means the official inter-modal transportation plan developed and adopted through the metropolitan transportation planning process for the metropolitan area. This is also referred to as the long range transportation plan.

Multi-Use Trail or Path means a hard surface, off-road path for use by bike, foot and other non-motorized traffic typically not within the road right-of-way.

National Highway System (NHS) means a federal transportation program, authorized in 1995, that includes the Interstate Highway System and other roads that are important to national defense, commerce, and mobility. The NHS in Indiana includes 2,897 miles of roadways and was developed by the U.S. Department of Transportation, in cooperation with INDOT and the State's MPOs.

No Build Condition, Option, Alternative or Alternate means a transportation plan, program or alternative involving no major capital investment. This is sometimes referred to as the "do-nothing" option. The No Build condition typically includes the existing transportation system plus committed or already programmed improvements to the transportation system.

Non-Attainment Area means any geographic region of the United States that the Environmental Protection Agency has designated as a non-attainment area for transportation related pollutants for which a National Ambient Air Quality Standard (NAAQS) exists.

Operational Improvement means a capital investment for the installation of traffic surveillance and control equipment, computerized signal systems, motorist information systems, integrated traffic control systems, incident management programs, and transportation demand management facilities, strategies or programs.

Operating Expense means the total of all operating costs incurred during the reporting period.

Operating Subsidy means the revenue received through federal, state, and local cash grants or reimbursements to fulfill operating expense obligations not covered by fares or other revenues generated by the transit system.

Peak Direction means the direction of higher demand during a peak commuting period.

Peak Hour means that one-hour period during which the maximum amount of travel occurs. Generally, there is a morning peak and an afternoon peak and traffic assignments may be made for each period, if desired.

Policy Committee is a committee of the MPO which reviews and approves transportation policy. It is composed of local elected and appointed officials from area municipalities, Indiana University and state and federal transportation agencies.

Preliminary Engineering (PE) means the first phase of a transportation improvement project, defines scope and project design.

Primary Arterial means a class of street serving major movement of traffic, typically carrying over 20,000 vehicles per day.

Primary Collectors means roadways that typically carry between 3,000 to 10,000 vehicles per day.

Radial Routes means transit service patterns, in which most routes converge into and diverge from a central transfer point or hub, like spokes of a wheel. If the routes are timed to arrive and depart at the same time, it is called a pulse system.

Revenue means all operating funds associated with the provision of transit service.

SAFETEA-LU stands for the Safe, Accountable, Flexible, Efficient Transportation Equity Act: a Legacy for Users. This is the five-year federal transportation program authorizing the annual funding for federal transportation programs and replaces TEA-21.

Secondary Arterial means a street typically carrying between 10,000 to 20,000 vehicles per day.

Secondary Collector means roadways in Bloomington that typically carry less than 3,000 vehicles per day.

Sidepath means a hard surface path physically separated from the road with a grass or tree plot within a road right of way for the use of bicyclists, pedestrians and other non-motorized users.

Sidewalk means a hard-surface path within the street right-of-way that is designated for the exclusive use of pedestrian traffic.

Signed Bike Routes means a street that is safe for use by both vehicles and bicycles without a designated bike facility. These routes are identified with appropriate signage.

Statewide Transportation Plan means the official statewide, multi-modal transportation plan that is developed through the statewide transportation planning process.

Thoroughfare Plan means the official plan for the designation and preservation of major public road rights-of-way in accordance with the Indiana Code (IC 36-7-4-506).

Technical Advisory Committee (TAC) is a committee of the MPO which provides technical advice on transportation projects and programs. It consists of MPO agencies planners, engineers and transit managers.

Transportation Demand Management (TDM) means strategies or actions taken to reduce or shift the peak-hour of travel demand or to shift the mode of travel demand. Typical actions to shift or reduce the peak-hour of travel demand involve programs to shift work hours, limit the trip generation of new development, and congestion tools. Typical actions to shift the mode of travel include transit fare subsidy programs, control of parking fees, expansion of transit services, construction/designation of high occupancy vehicle lanes or preferential parking areas, and construction of pedestrian and bicycle facilities.

Transportation Enhancement Activities (TEA) means the provision of facilities for pedestrians and bicycles, acquisition of scenic easements and/or scenic or historic sites, scenic and historic highway programs, landscaping and other scenic beautification, historic transportation buildings, structures or facilities (including historic railroad facilities and canals), preservation of abandoned railway corridors (including conversion and use thereof for pedestrian or bicycle trails), control and removal of outdoor advertising, archaeological planning and research, and mitigation of water pollution due to highway runoff.

Transportation Equity Act for the 21st Century (TEA-21) means the former six-year federal ground transportation program covering highways, transit and transportation enhancement activities. It authorized the annual funding for federal transportation programs prior to SAFETEA-LU, which was approved in 2005.

Transportation Improvement Program (TIP) means the staged, multi-year, multi-modal program of transportation projects which is consistent with the metropolitan transportation plan.

Transportation System Management (TSM) means a variety of low-cost capital investments or programs to preserve roadway capacity including signal system improvements, intersection improvements (adding turn lanes), access control policies, and transportation demand management strategies.

Urbanized Area (UZA) means a statistical geographic area defined by the U.S. Census Bureau that consists of a central core and adjacent densely settled territory containing a population of at least 50,000 people.

Unified Planning Work Program (UPWP) means the document which describes urban transportation and transportation related activities to be undertaken in an area during a period of time. The UPWP is prepared by the Metropolitan Planning Organization (MPO).

Volume To Capacity (V/C) Ratio means the observed number of vehicles or persons passing a point on a lane, roadway, or travel-way, compared to the maximum rate of flow at that point.